Standard Indicators
SCIENCE: 7.1.5, 7.1.6

Without Limits

Purpose

Students will identify some important contributions to the advancement of science, mathematics, and technology that have been made by different kinds of people, in different cultures, at different times, and will provide examples of people who overcame bias and/or limited opportunities in education and employment to excel in the fields of science.

Materials

For the teacher: chalk, chalkboard
For each group of students: copies of Black Line Master (BLM) *Without Limits*, research materials, paper, pencils
For the class: television, VCR, video camera, video equipment, props for commercials and news segments

Activity

A. Pre-Activity Preparation

1. Arrange for students to have access to the school library and the Internet for their research.
2. Arrange for the use of video equipment for several days.

B. Pre-Activity Discussion

1. Ask students to think of different scientists and their accomplishments and list them on the chalkboard.
2. Ask students: "What do you know about the lives of these scientists? What were their contributions to science? Did they have to overcome any obstacles in order to pursue their goals?"
3. Discuss how many scientists of different backgrounds have had to overcome bias and/or limited opportunities in order to reach their goals and excel in their fields.

C. Introduction to the Activity

1. Divide students into three groups. Label one group A, one group B, and one group C. Distribute a copy of the BLM *Without Limits* to each student.
2. Instruct students to read through the directions on the BLM and discuss the assignment with students.
3. Direct each group to choose at least two scientists to research.
4. Tell students that each group is responsible for the assigned tasks listed next to its group name on the BLM.
5. Allow students time to brainstorm ideas and encourage them to be creative in their news segments (e.g., role play, conduct interviews, etc.).
6. Make reference materials available and direct students to begin researching their scientists.

Technology Literacy Standards

	I	II	III	IV	V	VI	VII
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[X] = This Technology Literacy Standard is addressed in this lesson.

[ ] = This Technology Literacy Standard is not addressed in this lesson.

D. Preparation and Production

1. Help the class select two co-anchors and a technical crew.
2. Monitor and guide students as they outline and produce their news segments.
3. Advise students in the technical crew on their responsibilities as they work to produce each segment. Be sure that each group establishes deadlines to meet for production of each segment.
4. Monitor and advise students in Group B as they work on their commercials and students in Group C as they work on the introduction and credits.
5. Assist students in Group A in making their final edits and in putting together the entire show.

E. The Big Show

1. Show the completed video to the class.
2. Discuss each group's experiences in the production process.
3. As a class, discuss each scientist highlighted in the newscast.
4. Discuss and compare the scientists' accomplishments, backgrounds, and the challenges they faced in their careers.

Classroom Assessment

Basic Concepts and Processes

At the end of the activity, ask questions, such as:

- What important contributions to the advancement of science did your scientist make?
- What obstacles did your scientist have to overcome in order to succeed in his/her fields?
- Which characteristics of your scientist did you choose to highlight in your news segments, and how did you decide what to highlight?

Name: _____

Without Limits

Getting Started:

1. Choose two of the following scientists to research:

2. Your research should include, but is not limited to, the following:
   - Important contributions to science each person has made
   - The time period in which each scientist lives/lived
   - The cultural/ethnic background of each scientist
   - How each had to overcome bias and/or limited opportunities in education and/or employment to excel in his/her field
   - Any other noteworthy information

3. Prepare a news segment (for each scientist) that includes the above information. Your news segment will be part of a class-produced news program.

Putting It All Together

- Responsibilities for each group are as follows:
  - Group A: Report your news segments; perform final editing of all segments; put the news program together for taping
  - Group B: Report your news segments; write and produce three 1½ minute commercial skits relating to what the class researched
  - Group C: Report your news segments; create and produce the introduction and credits segments (beginning and end of program)
- The class will elect two co-anchors (one male and one female) to introduce each news segment in the broadcast.
- A technical crew taken from the three groups will be in charge of the video equipment and sets for the program.
- Each news segment is limited to 5 minutes of broadcast time.

Without Limits

Teacher Directions

Divide students into three groups and distribute a copy of the BLM *Without Limits* to each student. Have students read the BLM and discuss the assignment. Help the class select two co-anchors and a technical crew. Direct each group to choose at least two scientists to research; make sure no two groups choose the same scientist. Distribute necessary materials for research and production of the program, and direct students to begin working on their assignments. Monitor and assist students throughout the activity.

Answer Key

Information gathered for each scientist might include the following:

Elizabeth Blackwell (1821-1910). Born in England, Blackwell grew up in the United States. She was the first female physician in the United States and opened the New York Infirmary for Indigent Women and Children. She faced many educational and professional barriers because of her gender.

George Washington Carver (~1864-1943). Born into slavery in Missouri, Carver was orphaned at a young age. He became internationally known for his agricultural research; he invented hundreds of uses for peanuts, soybeans, pecans, and sweet potatoes. He also made great strides in biotechnology and farming methods. Carver faced many educational barriers because of his African heritage.

Jewel Plummer Cobb (1924-). Cobb grew up in an upper-middle class African American community in Chicago and earned a Master of Science and Ph.D. in cell physiology. She developed new therapeutic drugs for cancer and actively promotes science education programs for minority youths. Cobb faced educational and professional barriers because of race and gender.

Lise Meitner (1878-1968). Born in Austria, Meitner studied radioactivity and discovered nuclear fission. She faced educational and professional barriers because of her gender and race. Because she was of Jewish descent, Meitner fled Berlin during Hitler's reign. Meitner was denied the Nobel Prize for her work while she was living in exile.

Roger Arliner Young (1889-1964). Born in Virginia, Young was the first black woman to receive a doctoral degree in zoology. She studied paramecia and sea urchin eggs. Young faced educational, racial, and gender barriers while continuing her studies and teaching at the university level.

Rita Levi-Montalcini (1909-). Born in Italy. Levi-Montalcini won the 1986 Nobel Laureate in Medicine for her discovery of growth factors, which led to a better understanding of many diseases. In 1936, Mussolini barred non-Aryan citizens from pursuing professional careers. Although this limited her opportunities, Levi-Montalcini continued her studies.

Galileo Galilei (1564-1642). Born in Italy, Galilei made many discoveries and developed theories in astronomy and physics. He was denounced for his theories and was hindered from pursuing his studies by the Church, but continued publishing works based on his findings.

Percy Lavon Julian (1899-1975). Born in Alabama, Julian helped develop treatments for glaucoma and rheumatoid arthritis. He grew up with a limited education because of his race. Julian earned an international reputation for his work, but was still denied a professorship at DePauw University because of his race.

Charles Babbage (1791-1871). Born in England. Babbage invented the Difference Engine and Analytical Engine, which were precursors to the modern calculator and computer. He thought up challenging and questioning ideas, but was not supported by many colleagues and the government because of his visionary ideas.

Lydia Villa Komaroff (1947-). Born in Santa Fe, New Mexico, she was the third Mexican-American woman in the U.S. to earn a doctorate in the sciences. She was part of a team that discovered bacteria could produce insulin. Komaroff faced educational barriers at first due to her gender.